SECTION 19 - JACKING PIPE

19-1 GENERAL

This work shall consist of furnishing, boring, and jacking into place the type of pipe shown on the Plans or specified in the Special Provisions at locations and between the limits shown on the Plans or specified, and in accordance with these Specifications, the Standard Drawings and as directed by the Engineer.

19-2 MATERIALS

The casing pipe designed on the Plans shall be of the size and class (or strength designation) shown on the Plans or specified, except that the class of pipe designated has been determined for vertical loads only. Additional facilities, reinforcement, or strength of pipe required to withstand jacking pressure shall be determined and furnished by the Contractor at his expense.

Steel casing pipe shall have a wall thickness not less than that shown on the Plans, and shall be butt welded of sheets conforming to ASTM A-570 commercial grade or of plate conforming to ASTM A-283. All field joints also shall be butt welded full circumference or by other means approved by the Engineer. Joints to be field welded shall be shop cut to ensure a true 90° to the longitudinal axis of the pipe. Use of a jacking band to reinforce the end of the pipe receiving the jacking thrust will be required. It shall be the Contractor's responsibility to provide joints that are capable of resisting the jacking stresses without failure.

Carrier pipe to be installed within steel casing shall be as indicated on the Plans and/or Special Provisions.

Redwood blocks (or other methods approved by the Engineer) for supporting carrier pipe within steel casing shall be construction heart redwood, rough graded in accordance with the current standard specifications for structural grades of California redwood approved by the Board of Review, American Lumber Standards Committee and published by the Redwood Inspection Service. All material shall be well manufactured. Only pieces consisting of sound wood, free from decay or defect, will be accepted in the work. Redwood blocks shall be v-cut to fit the contour of the pipe.

Concrete for plugs to be placed at ends of casing pipe as shown on the Standard Drawings shall be Class 2, in conformance with Section 90, "PORTLAND CEMENT CONCRETE", of the State Standard Specifications.

19-3 EXCAVATION OF JACKING AND RECEIVING PITS

Excavation of jacking and receiving pits shall be sheathed, shored, sloped or braced in accordance with the Safety Regulations of the State of California, Department of Industrial Relations, Division of Industrial Safety.

19-4 BORING AND JACKING

Pipe shall be jacked in conformity with the prescribed lines and grades obtained from the stakes set by the Engineer. Excavation for the pipe shall be accomplished by boring or by hand digging. Sluicing or jetting with water will not be permitted.

The excavated hole, whether bored or hand dug, shall not be more than 1 inch in diameter greater than the outside limits of the casing. If the nature of the material is such that caving will likely occur and which may result in a greater space than above specified, a metal shield or jacking head shall be installed which extends a minimum of 16 inches ahead of the jacked casing or pipe. The metal shield shall cover a minimum of the upper ½ of the periphery of the jacked casing or pipe. Excavation shall not proceed beyond the shield.

Where ground conditions at the face of the jacking pit are such that sloughing or caving of ground is likely to occur at the face of the excavation upon commencement thereof, the face of the pit shall be made stable so that an excessive void is not carried with the face of the excavation for the length of the casing or pipe. This may be accomplished by solid sheathing at the portal of the jack, or excavating and backfilling the face of the pit with cohesive material.

Cavities or voids outside the limits specified above, regardless of cause, shall be backfilled with sand, soil, cement, or cement mortar as directed by the Engineer. All casing pipe 24 inches or larger, shall be furnished with preinstalled fittings suitable for attachment to grout pumping equipment. Such grout connections, unless otherwise indicated on the Plans, shall be placed at 30°, 120°, 240°, and 330°, measured clockwise, from vertical, around the circumference of the casing or pipe, and at intervals in each row, along the pipe, of no greater than 10 feet. Alternate bottom holes shall be staggered, and alternate top holes shall be staggered, so that one hole will occur at the top every 5 feet and one hole will occur a the bottom every 5 feet.

Immediately after completion of the jacking or boring operation, if in the opinion of the Engineer, excessive voids have been created outside the jacked pipe, lean grout shall be injected through the grout connections in such a manner as to completely fill all voids outside the casing pipe resulting from the jacking or boring operation. The lean grout shall consist of one part Portland cement to not more than 4 parts sand by volume, placed at low pressure. Grout pressure is to be controlled so as to avoid deformation of casing pipe and/or avoid movement of the surrounding soil. Sand for grout to be placed outside the casing shall be of such fineness that 100 percent will pass No. 8 sieve and not less than 35 percent will pass a No. 50 sieve. After completion of grouting, the grout connections shall be closed with cast-iron threaded plugs.

In general, excavated material shall be removed from the casing as jacking progresses and no accumulation of excavated material within the casing will be permitted. Should appreciable loss of ground occur in installations where the face of the excavation is accessible, the voids shall be backpacked promptly to the extent practicable with an approved soil cement.

Where carrier pipe is to be installed within a jacked casing, carrier pipe as shown on the Plans or indicated in the Special Provisions shall be installed within the casing pipe to the lines and grades shown on the Plans, and as indicated on the standard drawing pertaining thereto. The

carrier pipe shall be supported on skids during the installation of the pipe. The skids shall be installed in such a manner as to relieve the couplings from all load and bearing. At the successful completion of the installation, concrete end seals (concrete plugs) shall be installed in accordance with the standard drawing. Care shall be taken during the placement of these seals that the pipe is not damaged, deflected or displaced.

19-5 GRADE TOLERANCE

Steel casing pipe of the minimum size and thickness specified on the Plans shall be installed in place to grades required to install the carrier pipe at the design grade. The Contractor's attention is called to the fact that extreme care will be required in placing the casing pipe so as to permit the construction of the carrier pipe to the lines and grades as shown on the Plans. It shall be the Contractor's responsibility for selecting a size of casing, at or above the minimum specified, in order that the jacking may be done with a sufficient degree of accuracy to permit installation of the carrier pipe to the grade as shown on the Plans within the tolerances set forth in these Specifications for the particular carrier pipe installed. Any and all increases costs resulting from the Contractor's use of steel casing with greater diameter or thickness than the minimum specified shall be borne solely by the Contractor. Variations from theoretical alignment and grade of the steel casing at the time of completion of jacking shall not exceed one percent of the distance from the jacking point.

19-6 BACKFILL, COMPACTION AND RESTORATION OF SURFACES FOR JACKING AND RECEIVING PITS

Jacking and receiving pits shall be backfilled and compacted, and the surface restored, in accordance with Section 16, "TRENCHING AND TRENCH RESURFACING", of these Specifications.

Measurement for steel casing pipe jacked into place shall be by the lineal foot of casing pipe jacked into place as shown on the Plans or directed by the Engineer.

Where carrier pipe is indicated on the Plans to be placed within a jacked casing pipe, carrier pipe will be measured by the lineal of pipe installed.

19-7 PAYMENT

The unit price bid per foot for steel casing, jacked into place, shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all the work involved therein as shown on the Plans, as set forth in the Specifications, and as directed by the Engineer. This shall include, but not be limited to excavating, backfilling and compacting the jacking and receiving pits, boring and tunneling, furnishing and installing the casing complete with grout fittings, furnishing and installing metal shields, furnishing and installing skids and tie downs, grouting and backfill of voids, sealing ends of casing, and all other incidental work over and above the associated with the normal work of furnishing and installing the carrier pipe in a trench situation.
Carrier pipe to be placed in casing as shown on the Plans will be paid for as normal in-trench pipe as set forth in these Specifications for the particular type of pipe to be installed.